



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

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Toxicology Information on Haloacetic Acids (HAA) in Drinking Water

Disinfection of drinking water

The risk of illness from the group of chemicals known as disinfection byproducts (chemicals such as trihalomethanes and haloacetic acids) is a lot lower than the risk of illness from drinking water that is not disinfected. The United States Environmental Protection Agency (USEPA) focuses on two classes of disinfection byproducts: trihalomethanes and haloacetic acids. These classes of chemicals are used as indicators of the various byproducts that are present in disinfected water. The USEPA estimates that more than 260 million people in the US are exposed to disinfected water and disinfection byproducts.

USEPA statement on weighing risks versus benefits for disinfectant byproducts

Disinfection byproducts are a special case because decreasing disinfection byproduct risk could increase risks from disease-causing microorganisms. Eliminating or significantly decreasing disinfection to stop disinfection byproduct formation would seriously compromise overall public health protection. The USEPA's priority is maintaining protection from disease-causing microorganisms.

Water disinfection and formation of haloacetic acids

Disinfection byproduct chemicals are regulated by the state and federal government to ensure that water is properly disinfected and that concentrations of byproduct chemicals are below USEPA regulatory levels (called maximum contaminant levels or MCLs). Levels of haloacetic acids can change from day to day, depending on the season, water temperature, the amount of chlorine needed, the amount of plant material in the water, and other things. The amount of haloacetic acids may also be higher in water that comes from surface water (lakes and rivers) because that water contains more organic matter.

Health effects of haloacetic acids

Drinking water with disinfection byproducts at concentrations above the MCL on a daily basis for many years may cause adverse health effects (e.g., haloacetic acids may increase the risk of cancer based on information from studies in laboratory animals); however, these chemicals when found at elevated levels for a short period of time in water would not be expected to cause adverse health effects.

The sum of five haloacetic acids (or HAA5) is regulated as a group. They are:

- dichloroacetic acid
- trichloroacetic acid
- chloroacetic acid
- bromoacetic acid
- dibromoacetic acid

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The regulatory limit (MCL) for the HAA5 is 60 ppb (60 µg/L) (sum of the concentrations of all five haloacetic acids calculated as a running annual average at each sample location). In establishing the MCL and maximum contaminant level goals (MCLGs) for HAA5, the USEPA evaluated the complete health effects literature, including cancer and noncancer studies. The health effects associated with exposure to HAA5 vary with the specific HAA. Only one human study was located specifically with haloacetic acids and it found no association between exposures and reproductive/developmental effects. Very limited reproductive/developmental studies have been conducted with HAA5 in laboratory animals.

References

<http://water.epa.gov/lawsregs/rulesregs/sdwa/stage2/basicinformation.cfm#one>

<http://water.epa.gov/drink/contaminants/basicinformation/disinfectionbyproducts.cfm>

United States Federal Register. August 18, 2003. Environmental Protection Agency. National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule; National Primary and Secondary Drinking Water Regulations: Approval of Analytical Methods for Chemical Contaminants; Proposed Rule.

United States Federal Register. January 4, 2006. Environmental Protection Agency. National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule.
<http://water.epa.gov/lawsregs/rulesregs/sdwa/stage2/>